



Passive Thermal Energy Storage Platform

What is this Technology?

This technology leverages the inherent ability of building materials, such as concrete, drywall and steel, to store thermal energy. By creating a model of the building's physical structure and furnishings, and combining that with data on weather, grid-price fluctuations and HVAC efficiency, the platform evaluates hundreds of operating scenarios to create an optimal cooling strategy that automatically shifts HVAC electricity use to take advantage of lower night-time/early morning temperatures for less energy-intensive cooling.

Why is GSA Interested?

The technology has the potential to improve energy efficiency and tenant comfort while also reducing costs, extending equipment life, reducing greenhouse gas emissions, and supporting federal sustainability goals. The system can be integrated with grid operations to provide further cost savings.



ENERGY EFFICIENCY The technology increases cooling energy efficiency by shifting electricity use to take advantage of lower night-time and early morning temperatures. Previous case studies have shown HVAC cooling energy savings of 10%.



COST-EFFECTIVENESS Cost-effectiveness is a function of the building and HVAC characteristics, occupancy and operational schedules, and utility rate structures. When cooling savings are combined with demand response revenues or time of day pricing, the manufacturer estimates cost savings of 20%, peak demand savings of 30% and a payback of less than three months.



OPERATIONS & MAINTENANCE The technology uses cloud-based software and works with a wide range of building automation systems (BAS). It can be applied to any existing large commercial building (typically over 200,000 square feet) regardless of age. It requires no additional HVAC or sensor installations and therefore no additional maintenance. Installation is estimated at two weeks.



DEPLOYMENT POTENTIAL The technology is applicable to any commercial building with space cooling loads, a BAS, a central chilled water plant, and zone-level direct digital control (DDC) in at least 20% of the floor space. In addition, buildings should have temperature setpoint flexibility of a few degrees Fahrenheit during occupied hours and be unoccupied for part of the night to allow for precooling of the building.

The Green Proving Ground program has commissioned National Renewable Energy Laboratory to perform real-world measurement and verification of the passive thermal energy storage platform in a pilot installation in a federally-owned building.



The Green Proving Ground program leverages GSA's real estate portfolio to evaluate innovative sustainable building technologies. The program aims to drive innovation in environmental performance in federal buildings and help lead market transformation through deployment of new technologies.